NOAA's National Weather Service Kansas City/Pleasant Hill, Missouri

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Threatening Skies

"Working together to save lives."

Annual Severe Weather Awareness Week set for March 14–18, 2005

The National Weather Service, the Kansas Division of Emergency Management, and the Missouri State Emergency Management Agency have announced the annual Severe Weather Awareness week will be held **March 14 - 18, 2005.**

An area-wide tornado preparedness drill from the Pleasant Hill NWS office will be conducted at **1:30 p.m. on March 15.** Should the weather be threatening on March 15, the drill will be postponed until Thursday, March 17.

Local warning sirens, NOAA Weather Radio, and the Emergency Alert System will be activated to signal the start of the drill. Area residents should treat the drill as if it were an actual tornado emergency.

The purpose of the annual drill is to test everyone's readiness for life-threatening severe weather events such as tornadoes, flash floods, large hail, damaging winds, and lightning.

Area residents are encouraged to use Severe Weather Awareness Week as their springboard into preparing for the 2005 severe weather season. Daily themes during this week include:

Monday (2004 review)

Tuesday (Tornadoes)

Wednesday (Flash Floods)

Thursday (Lightning)

Friday (Hail and Wind).

More information about Severe Weather Awareness Week, along with awareness materials in electronic form, can be found on the web at:

www.crh.noaa.gov/eax. ◆

What's Hot?

- March 15: statewide tornado drills to be held at 1:30 p.m. (alternate weather date is March 17).
- Another active severe weather year.
- Watch-By-County debuts in 2005.
- Polygon warning initiative.
- National Flood Awareness Week March 21-25.
- VTEC partial implementation.

Inside this issue:

Another active year in 2004

By Mike Hudson, Warning Coordination Meteorologist

A record number of tornadoes touched down in 2003, across northwest Missouri and northeast Kansas. Many residents expected a quieter severe weather season in 2004.

Mother Nature had other plans though, and the 2004 severe weather season remained very active. A total of 31 tornadoes touched down in 2004, which tied the 2003 record total of tornadoes!

The state of Missouri recorded 63 tornadoes, and 30 of these struck in the northwest quarter of the state. An average year

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Another active severe weather season in 2004

Large hailstone which fell near Meadville 5/24/04

Tornado damage in Albany

(Continued from page 1)

brings 26 tornadoes to Missouri. In Kansas, a state record of 122 tornadoes was set in 2004. This broke the previous record of 116 set back in 1991. Only one of these 122 tornadoes affected far eastern Kansas. This tornado struck in eastern Linn County on May 26. Fortunately, despite the record number of tornadoes in Kansas, there were no tornado fatalities.

The most significant tornado of the year claimed three lives east of Weatherby, Missouri, on May 29. This tornado was rated an F4 on the Fujita damage scale, and it was the first F4 ever documented to have struck in Daviess or De Kalb counties.

The season started out on May 19, with significant flooding in Cass County. Hardest hit was the area around Lake Annette, where portions of Missouri Highway 2 were flooded for several days.

An active severe weather pattern continued for the remainder of the month of May. May 24 brought a series of tornadoes from just north of Mound City, Missouri, east to near Princeton. One of these tornadoes struck the city of Albany, and this tornado produced significant F2 damage along US Highway 136. A second storm that day produced a state record six-inch diameter hailstone near Meadville, and tornadoes near Chillicothe, Meadville and New Cambria.

Tornadoes struck periodically from May 26 to May 27. One late evening tornado struck in Linn County, Kansas, near Pleasanton. Storms the next day brought large hail to the Trenton area.

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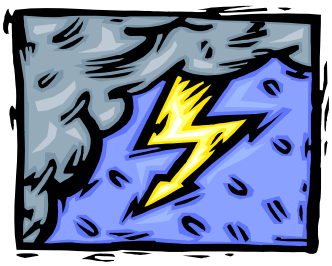
Changes to the NWS Severe Weather watch product suite

By Mike Hudson, Warning Coordination Meteorologist

NOAA's National Weather Service will implement changes to how it communicates severe weather watch information this spring. This process, known as Watch-By-County (WBC) will help many users streamline automated software programs for the issuance and clearance of counties within a severe thunderstorm or tornado watch. New products were added February 8, 2005, and the state local redefining statements were discontinued effective February 22, 2005.

The Storm Prediction



Center (SPC) in Norman, Oklahoma, will issue all severe thunderstorm and tornado watches in a bulletin called the Watch Outline Update (WOU). The WOU will contain a comprehensive list of all counties and cities contained in a watch.

The WOU bulletin from the Storm Prediction Center will replace the state local redefining statements (SLS) bulletins issued from St. Louis and Topeka. The SLS bulletins were discontinued on February 22, 2005.

The initial WOU will be an official product, as well as the final WOU on any given watch that cancels a watch early, or allows a watch to expire. Update WOU statements will be experimental in 2005. They will be issued during a watch to update the county and city listing for the entire watch, and to update information as the watch progresses and counties are cleared or added.

The updated WOU

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Changes to the NWS Severe Weather watch product suite

(Continued from page 2)

statements are fed from the local Pleasant Hill office through the WCN. The Pleasant Hill staff will issue experimental Watch County Notification (WCN) messages for all local severe thunderstorm and tornado watches. An initial WCN will be issued to provide a list of counties and cities within a convective watch within the CWA. Additional follow-up WCN messages will be issued to update a watch, to clear counties from within a watch, to cancel the entire watch, or to extend the watch out in time or in area. Each WCN will include every current valid watch within the CWA.

Since the WCN will be an experimental product in 2005, a Special Weather Statement (SPS) will still be issued to clear parts of a convective watch as in years past. The SPS will be discontinued after the WCN becomes operational in the fall of 2005.

Dissemination of watches over NOAA All-Hazards Weather Radio will continue unchanged from in the past. These messages will be updated using the new product suite.

Additional details on the new Watch-By-County process can be found at:

http://www.nws.noaa.gov/os/notification/notif04/scn04-48_wbc_opsaaa.txt. ◆

Convective Watch Product Suite effective February, 2005

Title	WMO header	AWIPS Product Identifier
Watch County Notification Message	WWUS63 KEAX	WCNEAX
Special Weather Statement	WWUS83 KEAX	SPSEAX
Watch Outline Update	WOUS64 KWNS	WOU(X)

(X) represents a number from zero (0) to nine (9). An example PID for a watch would be WOU9.

Watch products discontinued February 22, 2005

Title	WMO header	AWIPS Product Identifier
KS State Local Redefining Statement	WWUS63 KTOP	SLSKS
MO State Local Redefining Statement	WWUS63 KLSX	SLSMO

Polygon warning and one inch hail criteria initiative underway for 2005

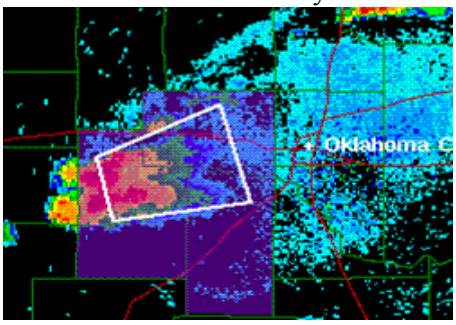
By Mike Hudson,
Warning Coordination Meteorologist

Severe thunderstorm, tornado, and flash flood warnings are issued by your National Weather Service to provide critical, life-saving information when threatening weather affects your county. *However, have you ever wondered if your part of the county was truly "under the threat" from the present storm?*

The National Weather Service office in Pleasant Hill will participate in a new warning initiative in 2005. This initiative, known as **Polygon Warnings**, will allow emergency management and the media to truly "see" the areas identified as being at the greatest risk from severe weather.

Polygons used to denote this risk area are defined as a set of four or more latitude and longitude points that can be displayed graphically. These coordinates can be found at the bottom of an NWS warning text message, denoted by the "LAT...LON" label. The polygon represents the area of maximum threat within the warned area.

Issuing warnings by Polygon gives the warning message many new advantages. The graphical depiction of the Polygon allows users to truly see the specific threat area. The Polygon approach also allows the warning team to reduce the areas needlessly warned



within a county. Note the smaller warning area within the Polygon

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How does your National Weather Service deliver severe weather information?

NWS Terms you should know:

- Tornado Watch
- Tornado Warning
- Severe Thunderstorm Watch
- Severe Thunder storm Warning
- Flood Watch
- Flash Flood Warning
- Flash Flood Statement
- Severe Weather Statement
- Hazardous Weather Outlook
- Significant Weather Alert

NOAA's National Weather Service uses specific terminology to relay the weather threat to the public in the fastest way possible. In the spring and summer, there are a variety of watches, warnings, and statements you need to understand in order to be prepared. Keep these in mind as we enter the 2005 Severe Weather Season:

Tornado Watch

Means that conditions are favorable for tornadoes to develop. It is normally issued for four to six hours, and can include many counties. If you are in or near the Tornado Watch area, stay informed with NOAA Weather Radio, commercial radio, or television.

Tornado Warning

Means that a tornado has been sighted, or a developing tornado is reported by trained spotters or indicated on Doppler radar. A warning is typically issued for a small area for less than an hour. If a Tornado Warning is issued for your area, take cover right away!

Severe Thunderstorm Watch

Means that conditions are favorable for thunderstorms to produce large hail or damaging winds. These watches are normally issued for four to six hours at a time, and for a large number of counties. Once again, if you are in or near the Severe Thunderstorm Watch area, stay informed with NOAA Weather Radio, commercial radio, or television.

Severe Thunderstorm Warning

Means that a severe thunderstorm has been detected by Doppler radar, or by a trained spotter. Severe thunderstorms produce wind gusts to 58 mph or stronger, or hail one inch in diameter or larger. Take cover quickly if a severe thunderstorm approaches you, or if one is reported in your area.

Severe Weather Statement

The Severe Weather Statement is a follow-up to Tornado and Severe Thunderstorm Warnings. These statements inform you of the current status of a tornado or severe thunderstorm. In addition, it gives the history of a storm, where it is moving, and who it will affect. This NWS product is also used to cancel or expire a warning.

Flood Watch

This is issued when heavy rain may develop and result in flash flooding in or near the watch area. A Flood Watch will also be issued if ground, river/stream conditions, or radar surveillance indicate flash flooding is possible, but not imminent within a designated area.

Flash Flood Warning

Means flash flooding has developed or is imminent in the area. When a Flash Flood Warning is issued, move to higher ground immediately!

Flash Flood Statement

Flash Flood Statements are used to continue, expire, or cancel Flash Flood Warnings. These statements provide additional or current information, and to keep you informed of the flooding status.

SIGNIFICANT WEATHER ALERT

New for 2005, a Special Weather Statement called a "Significant Weather Alert" will be issued to either address storms that are either just below severe criteria, or to give a heads-up for storms that are severe and are moving towards your area.

Hazardous Weather Outlook

This product issued by the NWS discusses the significant weather of the day, and also over the next seven days. It describes potential weather hazards for an area, and is especially created for trained spotters and Emergency Managers. The Hazardous Weather Outlook will detail the type of severe weather expected (if any), timing, and expected location of the severe weather. ◆

WIND SPEED ESTIMATE	
25-31 mph	Large branches in motion; whistling heard in telephone wires
32-38 mph	Whole trees in motion; inconvenience felt walking against the wind
39-54 mph	Twigs break off trees; wind generally impedes progress
55-72 mph	Damage to chimneys and TV antennas; pushes over shallow rooted trees
73-112 mph	Peels surfaces off roofs; windows broken light mobile homes pushed or overturned; moving cars pushed off road
113-157 mph	Roofs torn off houses; cars lifted off ground

Tornado Safety

- **IN HOMES OR SMALL BUILDINGS:** Go to the basement (if available) or to an interior room on the lowest floor, such as a closet or bathroom. Upper floors are unsafe. If there is no time to descend, go to a closet, a small room with strong walls, or an inside hallway. Wrap yourself in overcoats or blankets to protect yourself from flying debris.

- **IN SCHOOLS, HOSPITALS, FACTORIES, OR SHOPPING CENTERS:** Go to interior rooms and halls on the lowest floor. Stay away from glass-enclosed places or areas with wide-span roofs such as auditoriums and warehouses. Crouch down and cover your head. Don't take shelter in halls that open to the south or the west. Centrally-located stairwells are good shelter.

- **IN HIGH-RISE BUILDINGS:** Go to interior small rooms or halls. Stay away from exterior walls or glassy areas.

- **IN CARS OR MOBILE HOMES: ABANDON THEM IMMEDIATELY**! Most deaths occur in cars and mobile homes. If you are in either of those locations, leave them and go to a substantial structure or designated tornado shelter.

- **IF NO SUITABLE STRUCTURE IS NEARBY:** Lie flat in the nearest ditch or depression and use your hands to cover your head. Be alert for flash floods.

- **DURING A TORNADO:** Absolutely avoid buildings with large free-span roofs. Stay away from west and south walls. Remember, seek shelter on the lowest level, go to the smallest room, and center part of the building. ◆

Flood Safety

- **IF OUTDOORS:** Climb to safety if you hear or see signs of a flood, and take cover from other threatening weather as soon as possible.

- **IF CAMPING:** Be aware of your campground, and whether it is in a low lying area. Remember that flat areas may be dry streambeds, and that these streambeds may quickly flood with little warning.

- **MONITOR FLOOD WARNING INFORMATION:** NOAA All-Hazards Weather Radio is a great source to receive critical flood warning information directly from the NWS.

- **TURN AROUND, DON'T DROWN:** Most flood deaths occur at night, and in automobiles. Barricades across flooded roads are there for your protection. Drivers can lose control of their vehicles in as little as six inches of water. Two feet of water is generally enough to carry most vehicles away, including SUV's. Remember, the road bed under the water may have been scoured or even washed away during flooding, creating unsafe driving conditions.

- **IF TRAVELING TO THE EAST COAST OR GULF COAST:** Think inland flooding the next time you hear hurricane or tropical storm. Heavy rains from a land-falling tropical system can cause significant flooding well inland.

- **DEVELOP A FLOOD EMERGENCY ACTION PLAN:** Remember, floods can occur nearly everywhere and at any time of the year. Determine your flood risk and purchase flood insurance if necessary. Flood damage is not covered by homeowner's insurance. ◆

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Extreme Heat: Exposed

By Mike Hudson,
Warning Coordination Meteorologist

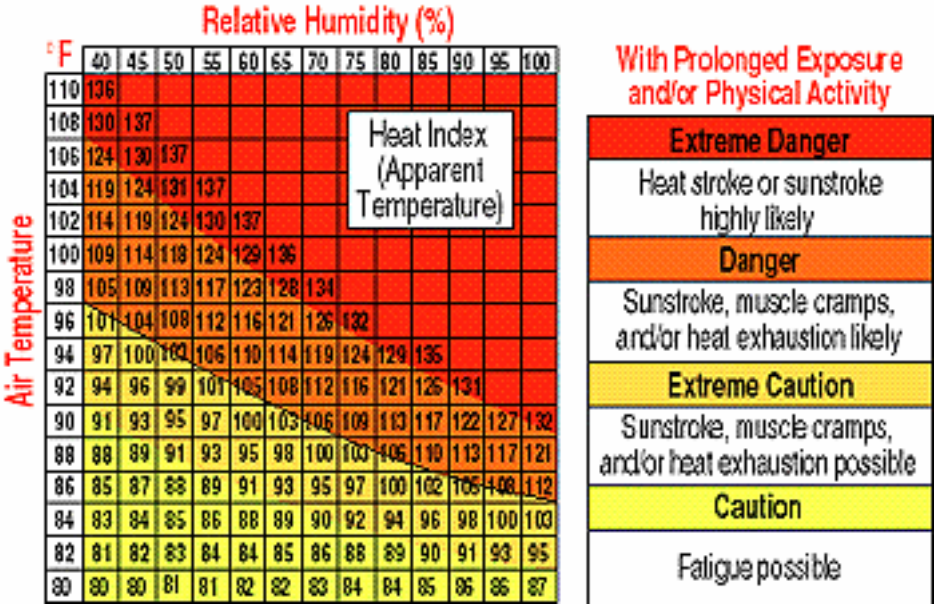
The Midwest is exposed to Mother Nature's worst each year. Temperatures in the Midwest can fluctuate to great extremes. In the summer months, temperatures commonly climb into the 90's, and when combined with extreme humidity, can create heat indices well over 100.

Tornadoes and severe thunderstorms receive the most publicity, but ***did you know that most weather related fatalities in the past few years were not associated with severe storms, but with extreme temperatures?***

On an average year in the United States, extreme heat will cause more than 175 deaths. In 2002, extreme heat claimed the lives of 16 people in Missouri. That number does not take into account the number of deaths that are accelerated by heat exposure.

As a means of lessening the threat, the National Weather Service issues advisories and warnings when excessive heat and humidity is expected. The NWS uses a defined "Heat Index" (HI), which is an accurate measure of how hot it really feels when the relative humidity is high. *(See diagram below.)*

The NWS will initiate alert procedures (advisories or warnings) when the (HI) is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. ◆



EXCESSIVE HEAT WARNING:

If the Heat Index (HI) equals or exceeds 115 degrees for three hours or longer, or 105 degrees for three consecutive days.

HEAT ADVISORY:

If the HI reach 105 degrees for three hours or more.

Hot terms you should know

- **HEAT WAVE:** Prolonged period of excessive heat, often combined with excessive humidity.
- **HEAT INDEX:** A number in degrees Fahrenheit (F) that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by 15 degrees.
- **HEAT CRAMPS:** Heat cramps are muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with the heat.
- **HEAT EXHAUSTION:** Heat exhaustion typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim's condition will worsen. Body temperature will keep rising and the victim may suffer heat stroke.
- **HEAT STROKE:** Heat stroke is life-threatening. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly. ◆

Polygon warning and one-inch hail initiative

(Continued from page 3…)

(white border) as opposed to the much larger county warning (shaded area).

Warnings by Polygon will also pose challenges to the warning team. Emergency managers may find that there is more than one warning in effect for different parts of their county at the same time. Explaining the threat areas to the public will also be a challenge without a graphical depiction of the warned area.

The legacy means of disseminating warnings (NOAA All-Hazards Weather Radio, text bulletins) will remain unchanged.

In conjunction with the Polygon Warning initiative, the Pleasant Hill office will also experiment with issuing Severe Thunderstorm Warnings for hail that is expected to reach one inch or greater in diameter. The definition of a severe thunderstorm remains unchanged, as a storm that produces three-quarter inch diameter or larger hail.

The NWS in Pleasant Hill will experiment with the larger hail criteria in the 2005 season, to see if the larger criteria makes the severe thunderstorm warning more effective in communicating a greater threat to property. This change will likely lead to a 30% to 40% reduction in the number of warnings. ◆

Hail

Hail rarely kills people, but it can become a killer if precautions are not taken. In May of 1986, China experienced such intense hail that it killed 100 people, injured 9,000, and destroyed 35,000 homes.

Valid Time Event Code implementation begins this spring

The National Weather Service will implement Valid Time Event Code (VTEC) in the suite of convective watches and warnings this spring. VTEC is an enhanced string of text, embedded within an NWS product, that better defines the product hazard, effective time and expiration time, as well as provides an internal counter to track the watches or warnings in effect.

Effective February 8, 2005, the National Weather Service (NWS) implemented operational VTEC in all short fuse warnings, and in the initial and final Watch Outline Update (WOU) issued by the Storm Prediction Center for convective watches. These products include:

Title	WMO header	AWIPS PID
Severe Thunderstorm Warning	WWUS53 KEAX	SVREAX
Tornado Warning	WFUS53 KEAX	TOREAX
Severe Weather Statement	WWUS53 KEAX	SVSEAX
Watch Outline Update	WOUS64 KWNS	WOU(X)

Experimental VTEC will also be utilized within the experimental Watch County Notification (WCN) messages issued by the NWS in Pleasant Hill.

Title	WMO header	AWIPS PID
Watch County Notification	WWUS63 KEAX	WCNEAX

Details on national VTEC implementation can be found on the web at http://weather.gov/os/notification/scn04-45aab_vtec.txt. Additional details on Valid Time Event Code can be found at http://weather.gov/om/vtec. ◆

National Flood Safety Awareness Week March 21-25, 2005

By Mike Hudson
Warning Coordination Meteorologist

NOAA's National Weather Service will hold its first-ever national flood safety awareness week campaign from March 21-25, 2005. Each day of the week will highlight a different element of the flood awareness program:

- Monday - Advanced Hydrologic Prediction Service
- Tuesday - Turn Around Don't Drown
- Wednesday - Tropical Cyclone Inland Flooding
- Thursday - Flood Hazard Mitigation
- Friday - Flood Safety

While this week was identified for a national campaign, the NWS office in Pleasant Hill will also address flood hazards as a theme in our local Severe Weather Awareness Week.

The goal of the national campaign is to highlight ways floods occur, the hazards associated with floods, and safety measures to protect life and property. During the 20th century, floods were the number one natural disaster in the United States in terms of the number of lives lost and property damage. In the 20 year period (1984-2003), on average, nearly 100 people died annually due to flooding while flood damages averaged $4.6 billion a year.

Additional information about National Flood Safety Awareness Week, including outreach materials to assist with your Flood Safety Awareness efforts. is available on the NWS Flood Safety website at:

http://weather.gov/floodsafety. ◆

Active 2004 severe weather season

(Continued from page 2…)

An outbreak of 11 tornadoes struck in a corridor that roughly paralleled I-35 in northern Missouri on May 29. Along with the killer tornado that struck near Weatherby, the other ten tornadoes struck in mainly rural areas near Platte City, Agency, Cameron, Plattsburg, Osborn, and Spickard. A very active May came to an end the next day, when a weak tornado touched down in open country near Braymer.

The last tornadoes of the year occurred October 29 near Warrensburg and in northwest Pettis County. These storms damaged several homes and farms west of Houstonia. ◆

Lightning Kills: Play it Safe!

By Mike Hudson,
Warning Coordination Meteorologist

Lightning is one of nature's most awe inspiring and dangerous phenomenon. The average lightning flash could light a 100-watt light bulb for more than three months! The temperature of a lightning bolt may reach **50,000 degrees Fahrenheit** which is hotter than the surface of the sun!

On average, lightning kills one person in Kansas and Missouri each year, and about 73 nationwide. **Remember, Lightning Kills, Play it Safe!**

The safest place to be in a thunderstorm is indoors, and away from windows. Do not remain outdoors when a thunderstorm approaches. If 30 seconds or less passes between a flash of lightning, and when you hear the thunder, you are at a greater danger of being struck by lightning. Lightning has been known to strike as many as ten miles from the parent thunderstorm. Go indoors, and wait until 30 minutes has passed since you heard the last clap of thunder before venturing back outdoors.

Lightning is a year-round threat. The National Weather Service holds National Lightning Safety Awareness Week each June. To learn more about lightning safety, and for additional resources for promoting lightning safety in your community, check out: **www.lightningsafety.noaa.gov**. ◆

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"Working together to save lives."